

## CLAIMS:

1. A fuel cell system comprising:

a fuel cell which generates electricity by a chemical reaction  
5 between a fuel gas supplied to an anode side of the fuel cell and an oxidization  
gas supplied to a cathode side of the fuel cell;

estimating means for estimating whether there is a possibility that  
a chemical short is occurring in the fuel cell when supply of the fuel gas and  
the oxidization gas to the fuel cell is stopped; and

10 scavenging means for supplying a scavenging gas to the cathode  
side when it has been estimated that there is a possibility that the chemical  
short is occurring.

2. The fuel cell system according to claim 1, wherein the estimating  
15 means is provided with gas pressure detecting means for detecting a gas  
pressure of the fuel gas on the anode side of the fuel cell, and closing means  
for closing off the anode side of the fuel cell when supply of the fuel gas and  
the oxidization gas to the fuel cell is stopped; and the estimating means  
estimates that there is a possibility that the chemical short is occurring when  
20 it has been determined that a gas pressure decrease amount of the fuel gas  
sealed on the anode side by the anode side being closed off by the closing  
means is greater than a first reference value.

3. The fuel cell system according to claim 2, wherein a first gas  
25 pressure of the fuel gas sealed on the anode side is detected after a first  
predetermined period of time has passed after the anode side of the fuel cell is  
closed off, and a second gas pressure of the fuel gas sealed on the anode side is  
detected after a second predetermined period of time has passed after the first  
gas pressure is detected, and a difference between the first gas pressure and

the second gas pressure is obtained as the gas pressure decrease amount.

4. The fuel cell system according to claim 1, wherein the estimating means is provided with concentration detecting means for detecting a gas concentration of the oxidization gas on the cathode side, and the estimating means estimates that there is a possibility that the chemical short is occurring when it has been determined that the gas concentration of the oxidization gas remaining on the cathode side of the fuel cell has decreased to less than a second reference value when supply of the fuel gas and the oxidization gas to the fuel cell is stopped.

5. The fuel cell system according to claim 1, wherein the estimating means is provided with gas pressure detecting means for detecting a gas pressure of the fuel gas on the anode side of the fuel cell, and closing means for closing off the anode side of the fuel cell when supply of the fuel gas and the oxidization gas to the fuel cell is stopped; and the estimating means obtains a gas pressure decrease amount of the fuel gas sealed on the anode side by the anode side being closed off by the closing means, estimates a consumption amount of the oxidization gas on the cathode side by the obtained gas pressure decrease amount, and estimates that there is a possibility that the chemical short is occurring when the estimated consumption amount is greater than a third reference value.

6. The fuel cell system according to claim 1, wherein when it has been estimated that there is a possibility that the chemical short is occurring, the estimating means again estimates whether there is a possibility that the chemical short is occurring, and when it has been estimated again that there is a possibility that the chemical short is occurring, the scavenging means supplies the scavenging gas to the cathode side.

7. The fuel cell system according to any one of claims 1 to 6, wherein the fuel gas is hydrogen gas, the oxidization gas is air, and the scavenging gas is a small amount of air.

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8. The fuel cell system according to any one of claims 1 to 7, wherein when it has been estimated that there is a possibility that the chemical short is occurring, the scavenging means supplies to the cathode side an amount of the oxidization gas that is less than the amount of the oxidization gas supplied to the cathode side when the fuel cell is idling.

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9. A vehicle comprising:

a power storage device capable of charging and discharging for driving the vehicle; and

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the fuel cell system according to any one of claims 1 to 8.

10. The vehicle according to claim 9, wherein when the fuel cell is stopped in an intermittent operating state, the estimating means estimates whether there is a possibility that the chemical short is occurring.

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11. A fuel cell system comprising:

a fuel cell which generates electricity by a chemical reaction between a fuel gas supplied to an anode side of the fuel cell and an oxidization gas supplied to a cathode side of the fuel cell;

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gas pressure detecting means for detecting a gas pressure of the fuel gas on the anode side of the fuel cell;

closing means for closing off the anode side of the fuel cell when supply of the fuel gas and the oxidization gas to the fuel cell is stopped; and

scavenging means for scavenging residual gas on the cathode side

by supplying a scavenging gas to the cathode side when a gas pressure decrease amount of the fuel gas sealed on the anode side by the anode side being closed off by the closing means is larger than a reference value.

5     12.         A fuel cell system comprising:

              a fuel cell which generates electricity by a chemical reaction between a fuel gas supplied to an anode side of the fuel cell and an oxidization gas supplied to a cathode side of the fuel cell;

              concentration detecting means for detecting a gas concentration of  
10     the oxidization gas on the cathode side; and

              scavenging means for scavenging residual gas on the cathode side by supplying a scavenging gas to the cathode side when the gas concentration of the oxidization gas remaining on the cathode side of the fuel cell falls below a reference value when supply of the fuel gas and the oxidization gas to the  
15     fuel cell is stopped.

13.         A fuel cell system comprising:

              a fuel cell which generates electricity by a chemical reaction between a fuel gas supplied to an anode side of the fuel cell and an oxidization  
20     gas supplied to a cathode side of the fuel cell;

              an estimating device that estimates whether there is a possibility that a chemical short is occurring in the fuel cell when supply of the fuel gas and the oxidization gas to the fuel cell is stopped; and

              a scavenging device that supplies a scavenging gas to the cathode  
25     side when it has been estimated that there is a possibility that the chemical short is occurring.

14.         A fuel cell system comprising:

              a fuel cell which generates electricity by a chemical reaction

between a fuel gas supplied to an anode side of the fuel cell and an oxidization gas supplied to a cathode side of the fuel cell;

a gas pressure detector which detects a gas pressure of the fuel gas on the anode side of the fuel cell;

5 a closing device that closes off the anode side of the fuel cell when supply of the fuel gas and the oxidization gas to the fuel cell is stopped; and

a scavenging device which scavenges residual gas on the cathode side by supplying a scavenging gas to the cathode side when a gas pressure decrease amount of the fuel gas sealed on the anode side by the anode side  
10 being closed off by the closing device is larger than a reference value.

15. A fuel cell system comprising:

a fuel cell which generates electricity by a chemical reaction between a fuel gas supplied to an anode side of the fuel cell and an oxidization  
15 gas supplied to a cathode side of the fuel cell;

a concentration detector which detects a gas concentration of the oxidization gas on the cathode side; and

a scavenging device which scavenges residual gas on the cathode side by supplying a scavenging gas to the cathode side when the gas  
20 concentration of the oxidization gas remaining on the cathode side of the fuel cell falls below a reference value when supply of the fuel gas and the oxidization gas to the fuel cell is stopped.

16. A control method for a fuel cell system provided with a fuel cell that  
25 generates electricity by a chemical reaction between a fuel gas supplied to an anode side of the fuel cell and an oxidization gas supplied to a cathode side of the fuel cell, comprising:

estimating whether there is a possibility that a chemical short is occurring in the fuel cell when supply of the fuel gas and the oxidization gas to

the fuel cell is stopped; and

supplying a scavenging gas to the cathode side when it has been estimated that there is a possibility that the chemical short is occurring.